The Utah Geological Survey's Ground-Water Monitoring Project in Utah's West Desert

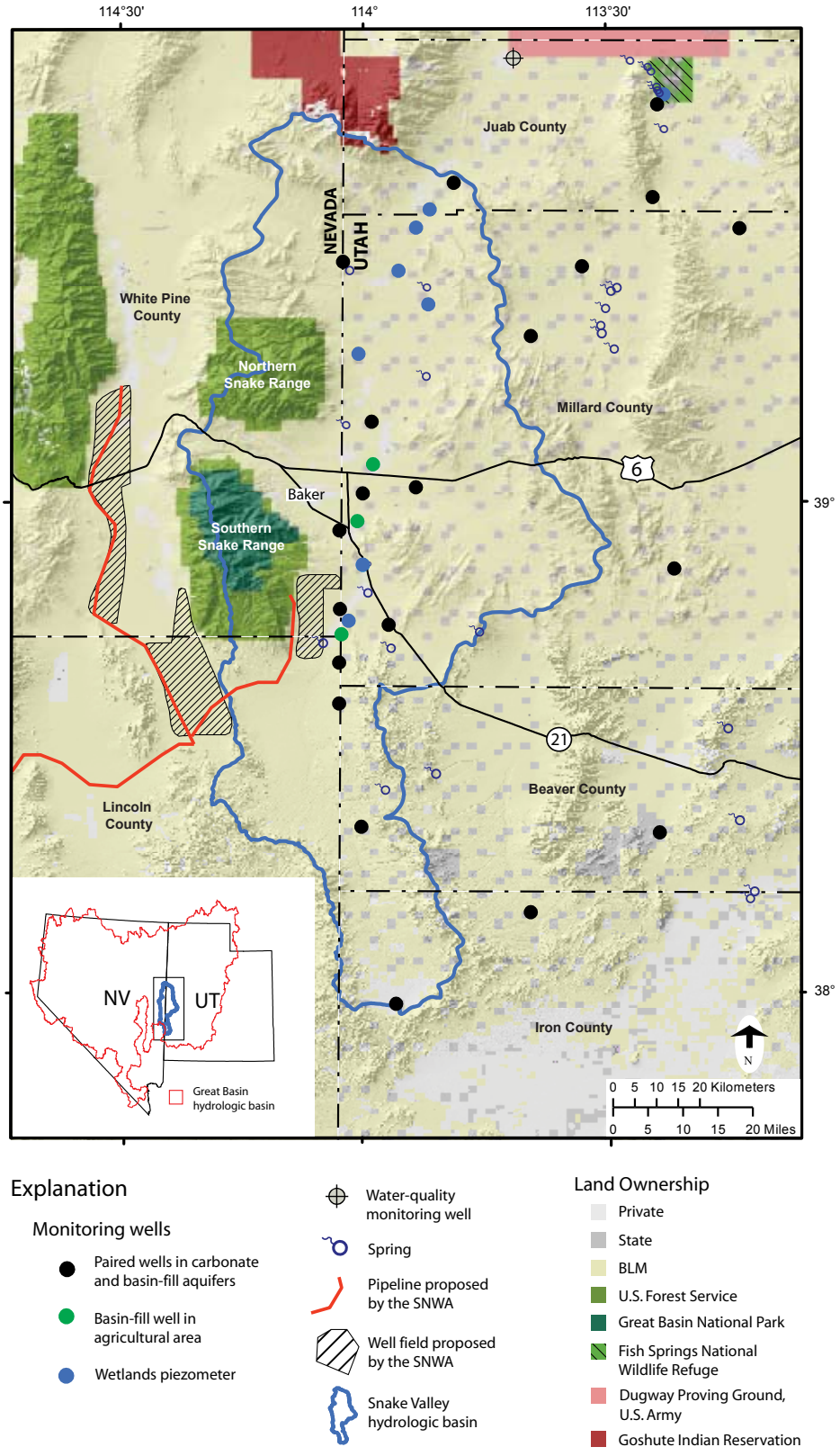
by Hugh A. Hurlow and Stefan Kirby

During its 2007 session, the Utah State Legislature charged the Utah Geological Survey (UGS) with establishing a ground-water monitoring network in Utah's west desert. The project is in response to proposed large-scale ground-water pumping in Spring and Snake Valleys, eastern White Pine and Lincoln Counties, Nevada, by the Southern Nevada Water Authority (SNWA), the principal water supplier for the Las Vegas area. Ground-water withdrawal by the proposed SNWA wells may cause long-term, large-scale declines in ground-water levels in Utah in western Millard, Juab, and Beaver Counties, and perhaps areas farther east including Fish Springs National Wildlife Refuge. Significant ground-water-level declines could have serious detrimental economic and environmental effects in Utah. For additional background on the proposed ground-water withdrawal, refer to the article in the May 2006 issue of *Survey Notes* (v. 38, no. 2).

The UGS ground-water monitoring network will include wells of various depths in various hydrogeologic settings (see accompanying map). Drilling began in early July 2007 and will continue sporadically over as much as three years. The objectives of the monitoring network are to define background water-level and geochemical conditions prior to SNWA pumping, and to quantify any changes in these conditions after pumping begins. The wells will be for monitoring purposes only, for at least the next 50 years.

Five classes of wells are planned: (1) paired wells screened in the carbonate-rock and basin-fill aquifers, 100 to 1500 feet deep; (2) wells in the basin-fill aquifer adjacent to areas of current agricultural use, 250 to 400 feet deep; (3) water-quality monitoring wells designed to track movement of saline ground water in the Great Salt Lake Desert near areas of current agricultural use; (4) spring-gradient wells designed to measure the hydraulic gradients contributing to spring discharge; and (5) shallow wells (piezometers) in Wetlands of Conservation Concern (i.e., wetlands occupied by Species of Conservation Concern) as defined by the Utah Division of

(continued on next page)



Project area showing proposed new ground-water monitoring wells.

(continued from previous page)

Wildlife Resources. A pumping well and two additional observation wells will be installed at two of the sites to accommodate aquifer testing. The UGS will perform aquifer tests and initial water-quality sampling and analysis, including major ions, stable and radiogenic isotopes, and dissolved gasses. The wells will be equipped with down-hole water-level data loggers.

Data from this project will improve our understanding of the regional ground-water flow systems in the carbonate and basin-fill aquifers in the west desert. The data may be used in a wide variety of applications, including constructing a regional ground-water flow model, geochemical modeling of the ground-water flow systems, hydrologic and biologic monitoring programs similar to those currently under design for Spring Valley, and establishing possible limits on future withdrawals.

The SNWA project has generated much activity in addition to the UGS ground-water monitoring project. In April 2007, the Nevada State Engineer ruled that SNWA may withdraw 40,000 acre-feet per year from Spring Valley for 10 years and an additional 20,000 acre-feet per year thereafter, subject to possible restrictions or cutbacks depending on the results of ground-water and biological monitoring during the first five years of pumping (http://water.nv.gov/scans/rulings/5726r.pdf.). During the Spring Valley hearing process, the U.S. Department of the Interior (DOI) agreed to withdraw its protests of SNWA's water-right applications in exchange for the establishment of a hydrologic and biologic monitoring program, to be cooperatively planned by SNWA and several divisions within the DOI (http://water.nv.gov/hearings/spring%20valley%20hearings/stipulation%20for%20withdrawal%20of%20protests.pdf). The Nevada State Engineer has not yet scheduled hearings on the Snake Valley applications. Negotiations between the Utah and Nevada State Engineers on an interstate water-use agreement for Snake Valley are currently in progress. The U.S. Geological Survey's Basin and Range Carbonate Aquifer System Study (BARCASS) report was released for public comment on June 1, 2007 (http://nevada.usgs.gov/barcass/index.htm) (see Director's Perspective in this volume). The Bureau of Land Management's (BLM) Environmental Impact Statement (EIS) for the proposed well and pipeline system is also underway (http://www.blm.gov/nv/st/en/prog/planning/groundwater_projects.html).

In addition to implementing the ground-water monitoring program, the UGS will continue its active role in the Snake Valley ground-water issue by monitoring developments on all of the projects mentioned above, reviewing the BARCASS report, maintaining its present network of six down-well transducers in Snake Valley, providing hydrogeologic review of the BLM's EIS process, and participating in a biologic working group initiated by the Utah Division of Wildlife Resources.